

Hyperkalemia Risk with Finerenone: Results from the FIDELIO-DKD Trial

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Table S1. Baseline demographics in patients with versus without any serum potassium concentration >5.5 mmol/L, by treatment group

Baseline demographics	No serum [K ⁺] >5.5 mmol/L		Any serum [K ⁺] >5.5 mmol/L	
	Finerenone (n=2151)	Placebo (n=2453)	Finerenone (n=676)	Placebo (n=378)
Sex, male, n (%)	1507 (70.1)	1772 (72.2)	442 (65.4)	252 (66.7)
Age, years, mean ± SD	65.64±8.95	65.96±9.08	64.87±8.87	63.70±9.44
Age category, n (%)				
<65 years	898 (41.7)	981 (40.0)	303 (44.8)	190 (50.3)
65–74 years	904 (42.0)	1056 (43.0)	291 (43.0)	143 (37.8)
≥75 years	349 (16.2)	416 (17.0)	82 (12.1)	45 (11.9)
Serum [K ⁺], mmol/L, mean ± SD	4.29±0.43	4.32±0.43	4.62±0.45	4.70±0.51
Serum [K ⁺], mmol/L, n (%)				
≤4.1	770 (35.8)	807 (32.9)	88 (13.0)	43 (11.4)
>4.1–≤4.5	808 (37.6)	898 (36.6)	213 (31.5)	110 (29.1)
>4.5–≤4.8	381 (17.7)	497 (20.3)	180 (26.6)	94 (24.9)
>4.8–≤5.0	107 (5.0)	140 (5.7)	84 (12.4)	48 (12.7)
>5.0	85 (4.0)	111 (4.5)	111 (16.4)	83 (22.0)

eGFR, mL/min/1.73 m ² , mean ± SD	45.03±12.54	44.66±12.34	42.22±12.30	42.17±13.82
eGFR category, mL/min/1.73 m ² , n (%)				
<25	48 (2.2)	54 (2.2)	18 (2.7)	15 (4.0)
25–<45	1060 (49.3)	1274 (51.9)	413 (61.1)	225 (59.5)
45–<60	782 (36.4)	829 (33.8)	189 (28.0)	97 (25.7)
≥60	261 (12.1)	296 (12.1)	56 (8.3)	41 (10.8)
UACR, mg/g, median (IQR)	820.42 (437.61–1551.41)	823.05 (442.76–1578.53)	866.85 (464.46–1803.19)	1161.43 (521.39–2236.54)
UACR category, mg/g, n (%)				
<30	8 (0.4)	10 (0.4)	3 (0.4)	2 (0.5)
30–<300	255 (11.9)	292 (11.9)	94 (13.9)	43 (11.4)
≥300	1887 (87.7)	2151 (87.7)	579 (85.7)	333 (88.1)
eGFR 25–<45 mL/min/1.73 m ² and serum [K ⁺] >4.5 mmol/L, n (%)				
No	1847 (85.9)	2050 (83.6)	447 (66.1)	252 (66.7)
Yes	304 (14.1)	403 (16.4)	229 (33.9)	126 (33.3)
History of CV disease, n (%)	986 (45.8)	1111 (45.3)	315 (46.6)	188 (49.7)

Label-recommended dose of RASI, n (%) ^a				
≤ minimum	648 (30.1)	720 (29.4)	218 (32.2)	113 (29.9)
> minimum to < maximum	501 (23.3)	624 (25.4)	161 (23.8)	102 (27.0)
≥ maximum	994 (46.2)	1102 (44.9)	297 (43.9)	161 (42.6)
Beta-blocker, n (%)	1101 (51.2)	1304 (53.2)	359 (53.1)	201 (53.2)
Diuretic, n (%)				
Loop	610 (28.4)	728 (29.7)	176 (26.0)	99 (26.2)
Thiazide	563 (26.2)	583 (23.8)	134 (19.8)	71 (18.8)
Potassium binders, n (%)	43 (2.0)	48 (2.0)	27 (4.0)	18 (4.8)
Potassium supplements, n (%)	74 (3.4)	82 (3.3)	11 (1.6)	3 (0.8)
Glucose-lowering therapies, n (%)	2080 (96.7)	2401 (97.9)	661 (97.8)	366 (96.8)
SGLT-2i	111 (5.2)	129 (5.3)	13 (1.9)	6 (1.6)

Percentages are rounded to the nearest decimal place. CV, cardiovascular; eGFR, estimated glomerular filtration rate; IQR, interquartile range; [K⁺], potassium concentration; RASI, renin–angiotensin system inhibitor; SD, standard deviation; SGLT-2i, sodium-glucose co-transporter-2 inhibitor; UACR, urine albumin-to-creatinine ratio.

^aInformation on RASI dosing was missing in 15 patients without any serum [K⁺] >5.5 mmol/L (8 patients in the finerenone group and 7 patients in the placebo group) and 2 patients with any serum [K+] >5.5 mmol/L (in the finerenone group).

Table S2. Baseline demographics in patients with versus without any serum potassium concentration >6.0 mmol/L

Baseline demographics	No serum [K ⁺] >6.0 mmol/L (n=5430)	Any serum [K ⁺] >6.0 mmol/L (n=228)
Sex, male, n (%)	3831 (70.6)	142 (62.3)
Age, years, mean ± SD	65.64±9.02	63.63±9.69
Age category, n (%)		
<65 years	2262 (41.7)	110 (48.2)
65–74 years	2298 (42.3)	96 (42.1)
≥75 years	870 (16.0)	22 (9.6)
Serum [K ⁺], mmol/L, mean ± SD	4.36±0.45	4.65±0.57
Serum [K ⁺], mmol/L, n (%)		
≤4.1	1677 (30.9)	31 (13.6)
>4.1–≤4.5	1960 (36.1)	69 (30.3)
>4.5–≤4.8	1097 (20.2)	55 (24.1)
>4.8–≤5.0	350 (6.4)	29 (12.7)
>5.0	346 (6.4)	44 (19.3)
eGFR, mL/min/1.73 m ² , mean ± SD	44.52±12.53	40.22±12.58
eGFR category, mL/min/1.73 m ² , n (%)		
<25	122 (2.2)	13 (5.7)
25–<45	2826 (52.0)	146 (64.0)
45–<60	1847 (34.0)	50 (21.9)
≥60	635 (11.7)	19 (8.3)
UACR, mg/g, median (IQR)	839.87 (442.88–1608.10)	1082.77 (562.93–2072.66)
UACR category, mg/g, n (%)		
<30	21 (0.4)	2 (0.9)

30–<300	660 (12.2)	24 (10.5)
≥300	4748 (87.4)	202 (88.6)
eGFR 25–<45 mL/min/1.73 m ² and serum [K ⁺] >4.5 mmol/L, n (%)		
No	4443 (81.8)	153 (67.1)
Yes	987 (18.2)	75 (32.9)
Label-recommended dose of RASI, n (%) ^a		
≤ minimum	1622 (29.9)	77 (33.8)
> minimum to < maximum	1334 (24.6)	54 (23.7)
≥ maximum	2457 (45.2)	97 (42.5)
Beta-blocker, n (%)	2855 (52.6)	110 (48.2)
Diuretic, n (%)	3102 (57.1)	102 (44.7)
Loop	1560 (28.7)	53 (23.2)
Thiazide	1310 (24.1)	41 (18.0)
Potassium binders, n (%)	123 (2.3)	13 (5.7)
Potassium supplements, n (%)	164 (3.0)	6 (2.6)
Glucose-lowering therapies, n (%)	5284 (97.3)	224 (98.2)
SGLT-2i	257 (4.7)	2 (0.9)

Percentages are rounded to the nearest decimal place. eGFR, estimated glomerular filtration rate; IQR, interquartile range; [K⁺], potassium concentration; RASI, renin–angiotensin system inhibitor; SD, standard deviation; SGLT-2i, sodium-glucose co-transporter-2 inhibitor; UACR, urine albumin-to-creatinine ratio.

^aInformation on RASI dosing was missing in 17 patients without any serum [K⁺] >6.0 mmol/L.

Table S3. Baseline demographics in patients with versus without any serum potassium concentration >6.0 mmol/L, by treatment group

Baseline demographics	No serum [K ⁺] >6.0 mmol/L		Any serum [K ⁺] >6.0 mmol/L	
	Finerenone (n=2680)	Placebo (n=2750)	Finerenone (n=147)	Placebo (n=81)
Sex, male, n (%)	1858 (69.3)	1973 (71.7)	91 (61.9)	51 (63.0)
Age, years, mean ± SD	65.48±8.91	65.79±9.12	64.90±9.51	61.32±9.64
Age category, n (%)				
<65 years	1135 (42.4)	1127 (41.0)	66 (44.9)	44 (54.3)
65–74 years	1133 (42.3)	1165 (42.4)	62 (42.2)	34 (42.0)
≥75 years	412 (15.4)	458 (16.7)	19 (12.9)	3 (3.7)
Serum [K ⁺], mmol/L, mean ± SD	4.36±0.45	4.36±0.45	4.62±0.50	4.71±0.69
Serum [K ⁺], mmol/L, n (%)				
≤4.1	839 (31.3)	838 (30.5)	19 (12.9)	12 (14.8)
>4.1–≤4.5	973 (36.3)	987 (35.9)	48 (32.7)	21 (25.9)
>4.5–≤4.8	526 (19.6)	571 (20.8)	35 (23.8)	20 (24.7)
>4.8–≤5.0	170 (6.3)	180 (6.5)	21 (14.3)	8 (9.9)
>5.0	172 (6.4)	174 (6.3)	24 (16.3)	20 (24.7)
eGFR, mL/min/1.73 m ² , mean ± SD	44.62±12.55	44.41±12.50	39.51±11.19	41.51±14.75

eGFR category, mL/min/1.73 m ² , n (%)				
<25	57 (2.1)	65 (2.4)	9 (6.1)	4 (4.9)
25–<45	1376 (51.3)	1450 (52.7)	97 (66.0)	49 (60.5)
45–<60	938 (35.0)	909 (33.1)	33 (22.4)	17 (21.0)
≥60	309 (11.5)	326 (11.9)	8 (5.4)	11 (13.6)
UACR, mg/g, median (IQR)	818.57 (438.43–1593.89)	860.60 (447.76–1617.35)	1069.76 (558.44–2046.04)	1255.60 (637.20–2088.09)
UACR category, mg/g, n (%)				
<30	10 (0.4)	11 (0.4)	1 (0.7)	1 (1.2)
30–<300	333 (12.4)	327 (11.9)	16 (10.9)	8 (9.9)
≥300	2336 (87.2)	2412 (87.7)	130 (88.4)	72 (88.9)
eGFR 25–<45 mL/min/1.73 m ² and serum [K ⁺] >4.5 mmol/L, n (%)				
No	2197 (82.0)	2246 (81.7)	97 (66.0)	56 (69.1)
Yes	483 (18.0)	504 (18.3)	50 (34.0)	25 (30.9)
History of CV disease, n (%)	1237 (46.2)	1257 (45.7)	64 (43.5)	42 (51.9)
Label-recommended dose of RASI, n (%) ^a				

≤ minimum	815 (30.4)	807 (29.3)	51 (34.7)	26 (32.1)
> minimum to < maximum	628 (23.4)	706 (25.7)	34 (23.1)	20 (24.7)
≥ maximum	1229 (45.9)	1228 (44.7)	62 (42.2)	35 (43.2)
Beta-blocker, n (%)	1389 (51.8)	1466 (53.3)	71 (48.3)	39 (48.1)
Diuretic, n (%)	1509 (56.3)	1593 (57.9)	65 (44.2)	37 (45.7)
Loop	754 (28.1)	806 (29.3)	32 (21.8)	21 (25.9)
Thiazide	668 (24.9)	642 (23.3)	29 (19.7)	12 (14.8)
Potassium binders, n (%)	63 (2.4)	60 (2.2)	7 (4.8)	6 (7.4)
Potassium supplements, n (%)	81 (3.0)	83 (3.0)	4 (2.7)	2 (2.5)
Glucose-lowering therapies, n (%)	2596 (96.9)	2688 (97.7)	145 (98.6)	79 (97.5)
SGLT-2i	123 (4.6)	134 (4.9)	1 (0.7)	1 (1.2)

Percentages are rounded to the nearest decimal place. CV, cardiovascular; eGFR, estimated glomerular filtration rate; IQR, interquartile range;

[K⁺], potassium concentration; RASI, renin–angiotensin system inhibitor; SD, standard deviation; SGLT-2i, sodium-glucose co-transporter-2

inhibitor; UACR, urine albumin-to-creatinine ratio.

^aInformation on RASI dosing was missing in 17 patients without any serum [K⁺] >6.0 mmol/L (8 patients in the finerenone group and 9 patients in the placebo group).

Table S4. Use of potassium binders at baseline and during the FIDELIO-DKD trial

	Finerenone (n=2827)	Placebo (n=2831)	Total (N=5558)
Patients receiving a potassium binder at baseline, n (%)	70 (2.5)	66 (2.3)	136 (2.4)
Calcium polystyrene sulphonate	51 (1.8)	40 (1.4)	91 (1.6)
Sodium polystyrene sulphonate	17 (0.6)	24 (0.8)	41 (0.7)
Patiromer	2 (<0.1)	2 (<0.1)	4 (<0.1)
Patients receiving a potassium binder at any point during the trial, n (%)	307 (10.9)	183 (6.5)	490 (8.7)
Calcium polystyrene sulphonate	154 (5.4)	102 (3.6)	256 (4.5)
Sodium polystyrene sulphonate	149 (5.3)	80 (2.8)	229 (4.0)
Patiromer	18 (0.6)	9 (0.3)	27 (0.5)
Sodium zirconium cyclosilicate	9 (0.3)	5 (0.2)	14 (0.2)

FIDELIO-DKD, Finerenone in reducing kidney failure and disease progression in Diabetic Kidney Disease

Supplemental Figures

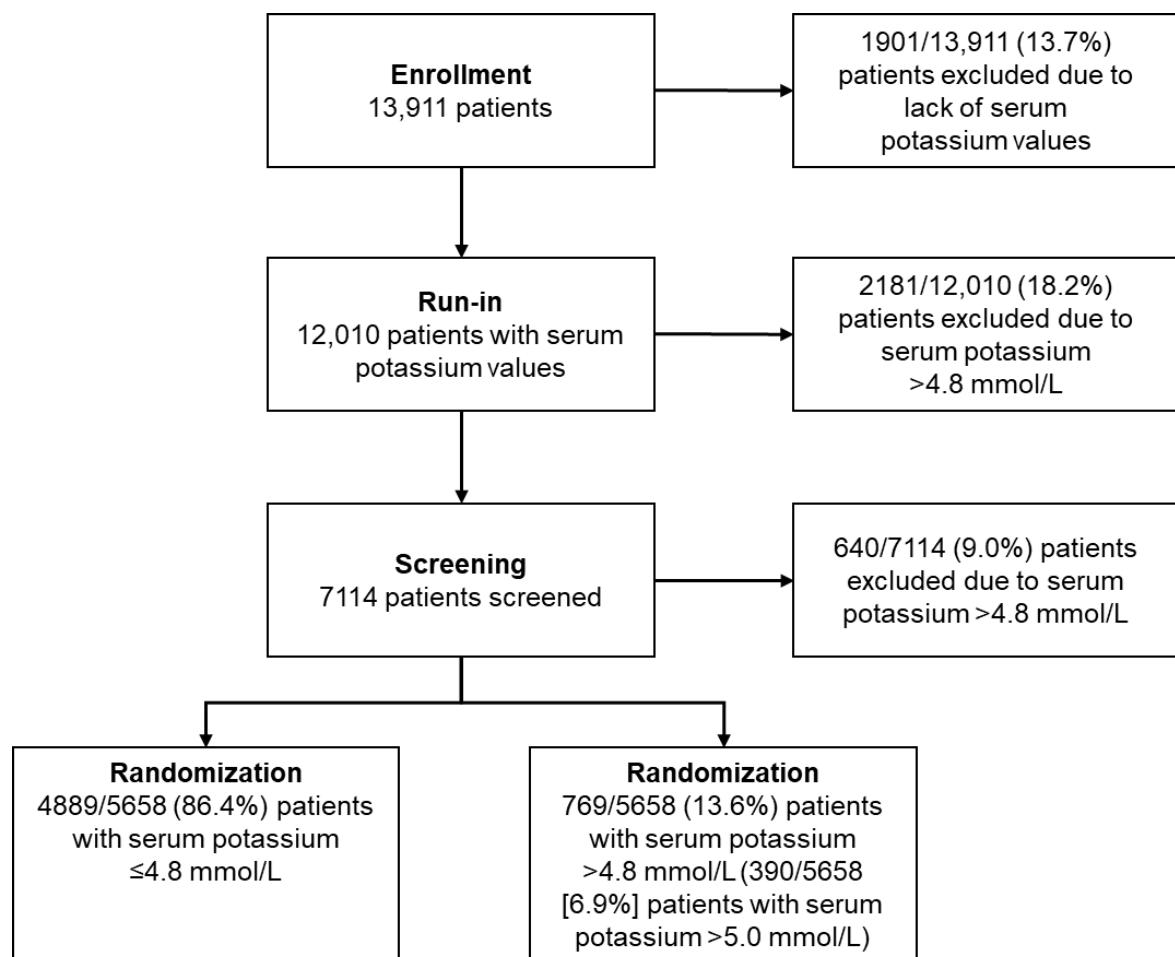


Figure S1. Flow of patients through the study from enrollment to randomization based on inclusion/exclusion related to serum potassium measurements.

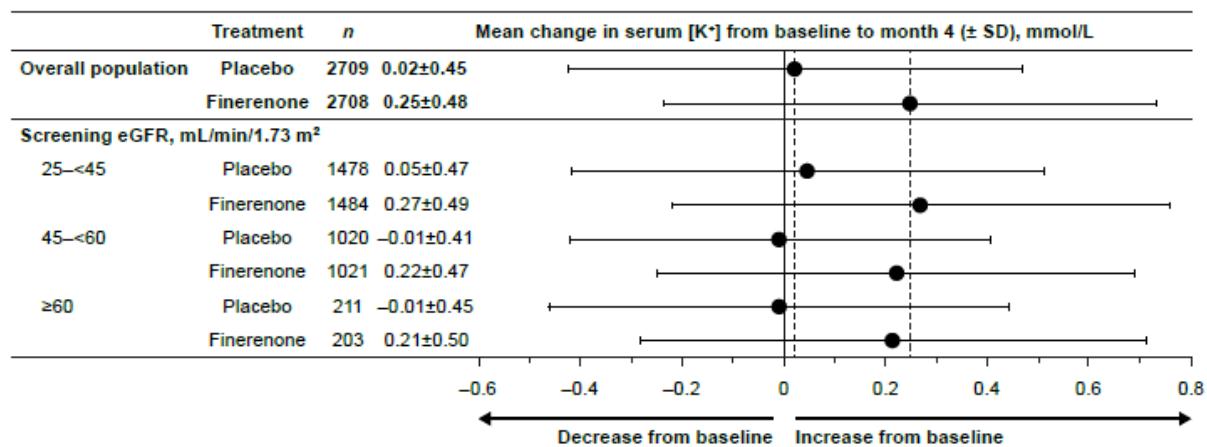


Figure S2. Mean change in serum potassium concentration from baseline to month 4 in the overall population and by eGFR category at the screening visit. eGFR, estimated glomerular filtration rate; SD, standard deviation.

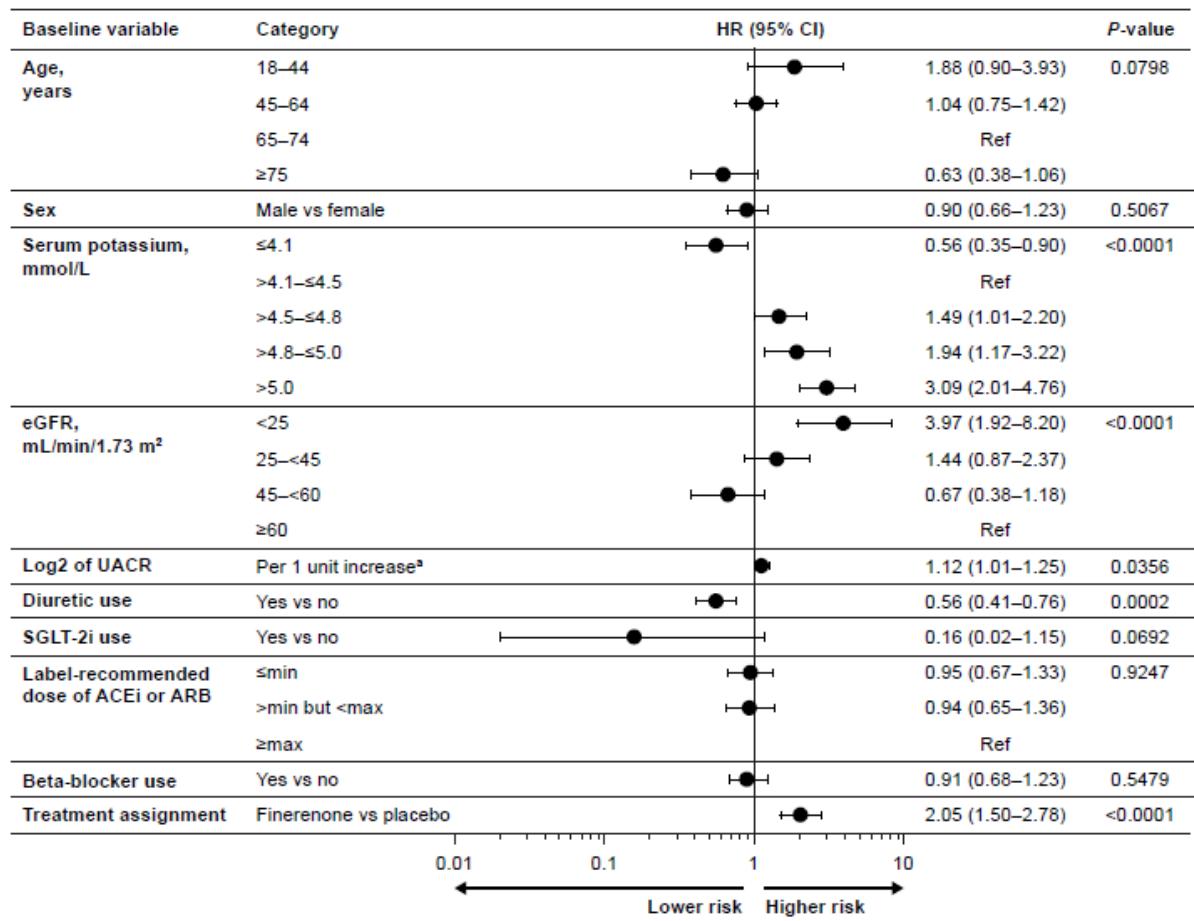


Figure S3. Multivariate analysis of time to any serum potassium concentration >6.0 mmol/L.

ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CI, confidence interval; eGFR, estimated glomerular filtration rate; HR, hazard ratio; SGLT-2i, sodium-glucose co-transporter-2 inhibitor; UACR, urine albumin-to-creatinine ratio. ^aUACR is modelled as a continuous variable; 1 unit change in Log₂ UACR denotes doubling of UACR.

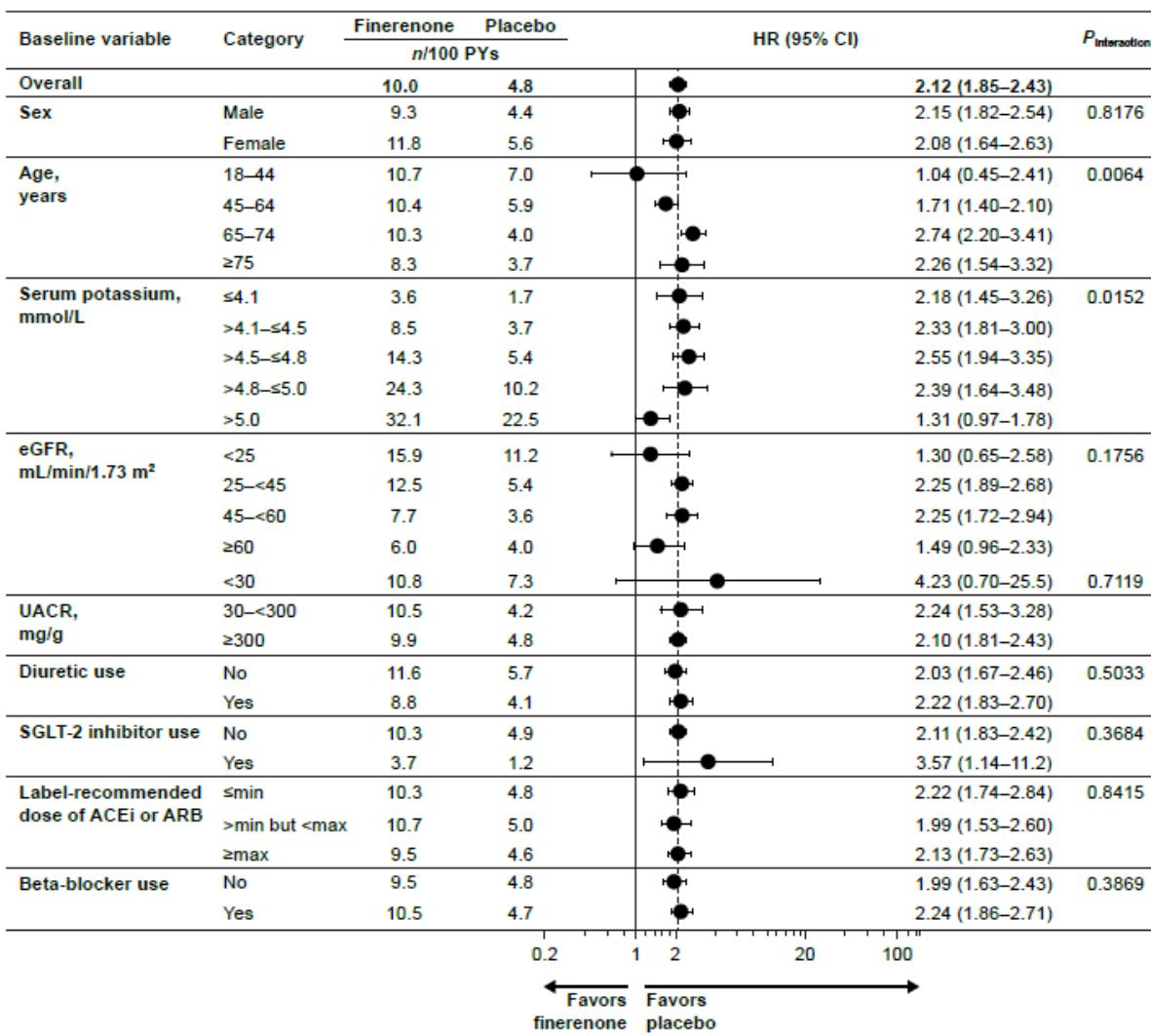


Figure S4. Impact of finerenone on hyperkalemia risk (serum potassium concentration >5.5 mmol/L) in patient subgroups. ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CI, confidence interval; eGFR, estimated glomerular filtration rate; HR, hazard ratio; PY, patient-year; SGLT-2, sodium-glucose co-transporter-2; UACR, urine albumin-to-creatinine ratio.

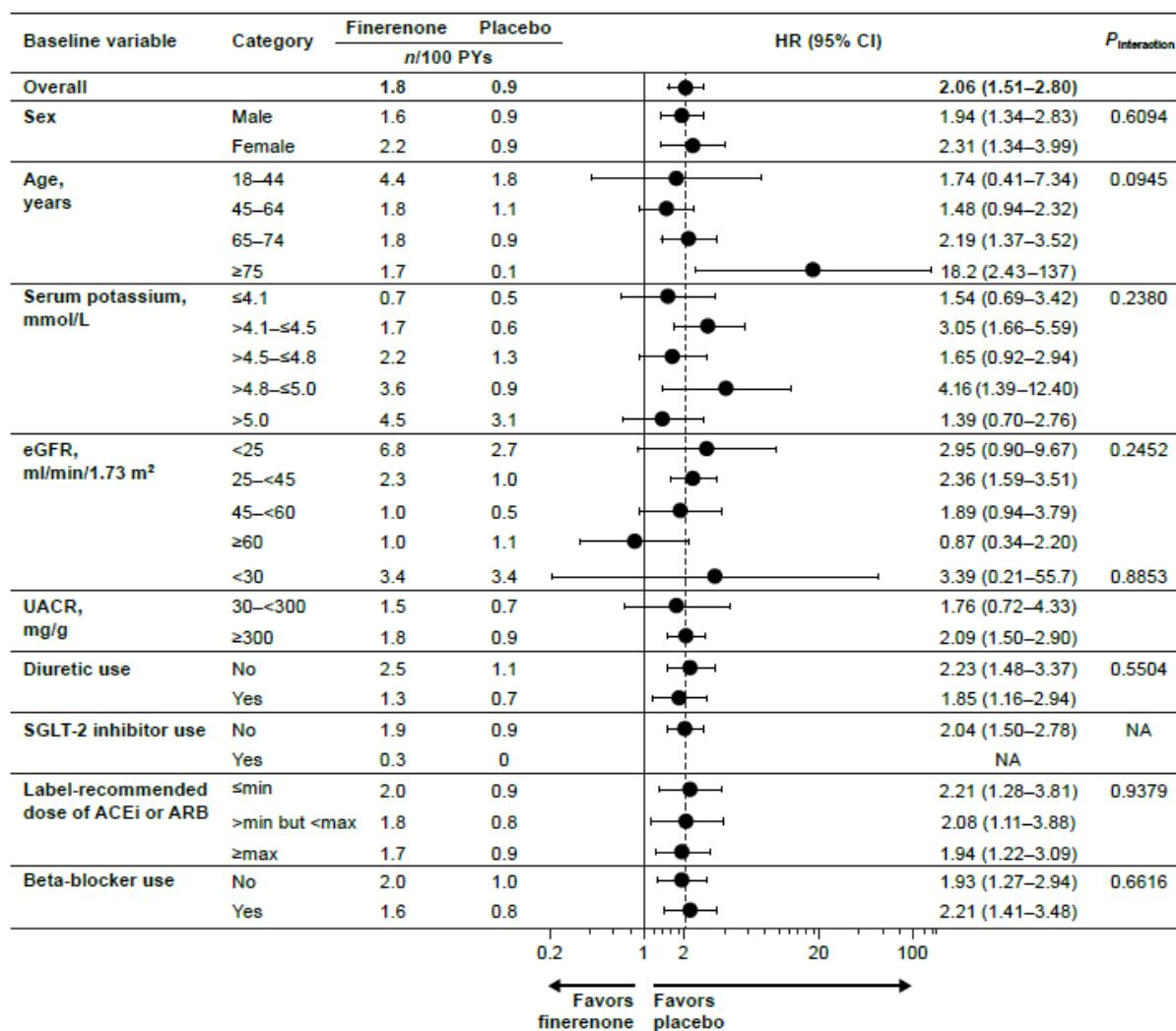


Figure S5. Impact of finerenone on hyperkalemia (serum potassium concentration >6.0 mmol/L) in patient subgroups. ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; CI, confidence interval; eGFR, estimated glomerular filtration rate; HR, hazard ratio; PY, patient-year; SGLT-2, sodium-glucose co-transporter-2 inhibitor; UACR, urine albumin-to-creatinine ratio.

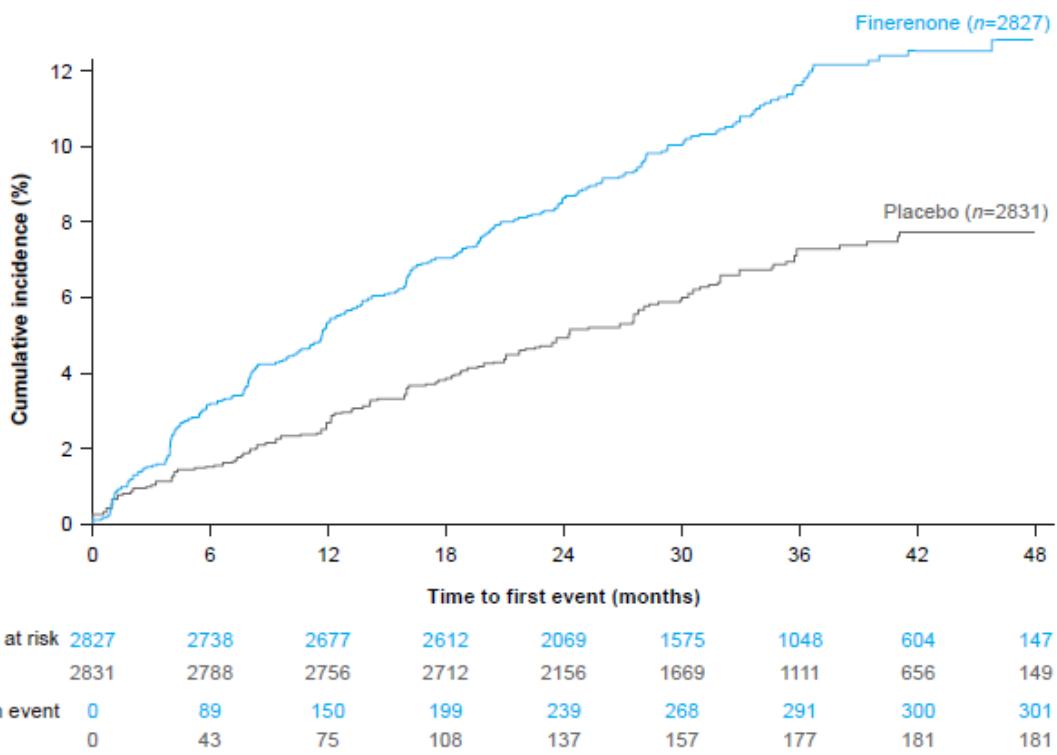


Figure S6. Time to first use of potassium binders.

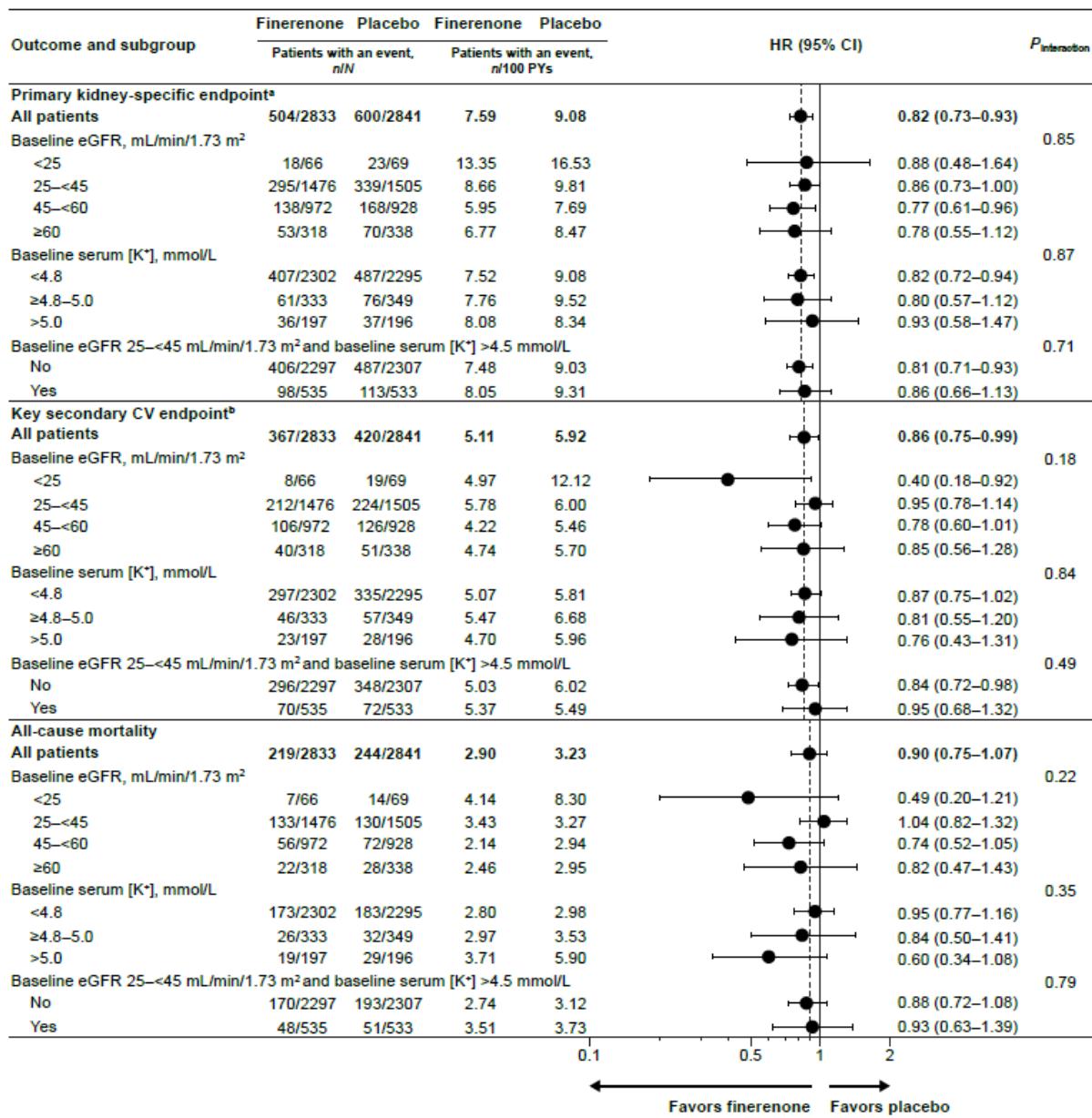


Figure S7. Primary composite kidney, key secondary composite CV, and all-cause mortality outcomes in patient subgroups at highest risk of hyperkalemia. CI, confidence interval; CV, cardiovascular; eGFR, estimated glomerular filtration rate; HR, hazard ratio; [K⁺], potassium concentration; MI, myocardial infarction; PY, patient-year. ^aTime to first onset of kidney failure, a sustained ≥40% decrease in eGFR from baseline over ≥4 weeks, or renal death; ^btime of first onset of CV death, non-fatal stroke, non-fatal myocardial infarction, or hospitalization for heart failure.

Supplemental Appendix 1. Full member list of the FIDELIO-DKD Investigators

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